

# ZIPPER STRIP AND MAKING OF RESEALABLE BAGS

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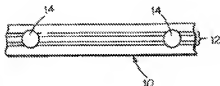
EP0481783 (A2)

US5273511 (A)

WO9611130 (A2)

**Abstract of WO 0008963 (A1)**

A zipper strip (10) for reclosable plastics bags and having interengageable male and female profile portions (12) is provided at intervals along its length with holes (14) therethrough of a size and location to bridge the male and female profile portions. This is to assist in the sealing at the side seams of the completed bags. Fusion points can also be made adjacent to each side of each hole to fuse the male and female profile portions together at these points.



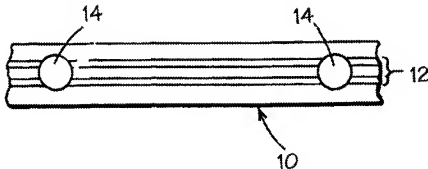
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<b>(21) International Application Number:</b> PCT/GB99/02661 <b>(22) International Filing Date:</b> 12 August 1999 (12.08.99) <b>(30) Priority Data:</b> 9817438.6 12 August 1998 (12.08.98) GB 9820696.4 24 September 1998 (24.09.98) GB <b>(71) Applicant (for all designated States except US):</b> SUPREME PLASTICS GROUP LIMITED (GB/GB); 300 Regents Park Road, Finchley, London N3 2TL (GB). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> LEIGHTON, Murray, Edward, Bruce (GB/GB); Supreme Plastics Limited, Stainsacre Lane, Whitby, N Yorkshire YO22 4PT (GB). <b>(74) Agent:</b> THOMSON, Roger, Bruce; W P Thompson & Co, Eastcheap House, Central Approach, Letchworth, Hertfordshire SG6 3DS (GB).		<b>(81) Designated States:</b> AU, CA, GB, JP, NZ, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). <b>Published</b> <i>With international search report.</i>

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(57) Abstract

A zipper strip (10) for reclosable plastics bags and having interengageable male and female profile portions (12) is provided at intervals along its length with holes (14) therethrough of a size and location to bridge the male and female profile portions. This is to assist in the sealing at the side seams of the completed bags. Pushion points can also be made adjacent to each side of each hole to fuse the male and female profile portions together at these points.

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ZIPPER STRIP AND MAKING OF RESEALABLE BAGS

This invention relates to an improved zipper for use in the operation of form-fill-seal and conversion machines as used for the manufacture and filling of resealable plastics 5 bags. Such bags have a reclosable fastening strip adjacent to the mouth of the bag. The invention also relates to methods of and apparatus for the making of resealable plastics bags, pouches and the like using such zipper.

One such form and fill machine for resealable plastics 10 bags is described in WO96/11138. In that machine a zipper strip is introduced into a folded web, and the combination is passed through a first station at which the zipper strip is heat sealed to the folded web, and then through a second station at which there is positioned an ultrasonic welder. 15 The ultrasonic welding station compresses and fuses together a short portion of the zipper strip each time that the intermittently moving web stops. The compressed portions are arranged to be at bag-width intervals. In the subsequent form and fill machine there are side seam forming jaws which are 20 operated so as to form the side seams in line with the compressed or flattened portions of the zipper strip, and to sever the bags from each other so that at each side of the bag there is part of the flattened portion. The intention is that the ends of the zipper strip of each bag are thus securely 25 fixed together.

It is an object of the present invention to provide means whereby the use of an ultrasonic welding station to fuse portions of the zipper strip is rendered unnecessary. The inclusion of an ultrasonic welding station to fuse the zipper 30 strip considerably complicates the travel path of the web/zipper combination and inter alia creates problems of

synchronisation between the first and second stations, as well as wandering of the web.

In accordance with the present invention, this object is achieved by the use of a zipper strip having male and female profile portions and provided at intervals along its length with holes therethrough of a size and location to bridge the male and female profile portions. The use of a zipper strip with holes, e.g. punched holes, of a dimension to bridge the male/female profile portion of the zipper strip achieves the same result as is achieved by the known fusing technique, but in a far simpler manner, as well as producing an attractive product.

By taking out the profile portion of the zipper strip at intervals one is just as effectively preventing leakage from the filled bag as by fusing the fastening strip. The particular advantage of providing spaced punched holes in the zipper strip is that this can be carried out before the zipper and web of sheet material are brought together and heat sealed one to the other. The punching of the zipper strip is preferably carried out at a position shortly before the zipper is sealed onto the web. This minimizes any problems of synchronisation due to stretch.

Also in accordance with the invention there is provided a method of making zipper strip which comprises the steps of:

- a) delivering zipper strip having interengaged male and female profile portions to a perforating device; and
- b) making holes therethrough at intervals along the length of the strip of a size and location to bridge the male and female profile portions.

Preferably, the method includes fusing the male and female profile portions together adjacent to each side

of each hole.

The invention also includes a method of manufacturing a reclosable plastics bag which comprises the steps of:

- i) delivering a film or web of plastics material from  
5 a supply means to bag-forming means;
- ii) delivering zipper strip having male and female profile portions from a supply means to the film or web and sealing the zipper strip thereto; and
- 10 iii) before the aforesaid sealing, making holes through the zipper strip at intervals along its length of a size and location to bridge the male and female profile portions.

Also in accordance with the invention there is provided apparatus for making reclosable plastics bags which comprises:

- 15 i) supply means for a film or web of plastics material;
- ii) supply means for zipper strip having interengageable male and female profile portions;
- 20 iii) sealing means arranged to seal the zipper strip to the film or web;
- iv) bag-forming means following the sealing means; and
- v) perforating means on the path of the zipper strip between its supply means and the sealing means, the perforating means being arranged to make holes  
25 through the zipper strip at intervals along its length of a size and location to bridge the male and female profile portions.

In order that the invention may be more fully understood, preferred embodiments in accordance with the invention will  
30 now be described by way of example and with reference to the accompanying drawings, in which:

Fig. 1 is a schematic diagram showing a length of zipper

strip having a hole punched therethrough;

Fig. 2 is a schematic diagram illustrating one arrangement for producing the perforated zipper shown in Fig. 1;

5 Fig. 3 is a schematic illustration of an alternative arrangement to that shown in Fig. 2;

Fig. 4 illustrates the passage of the film/zipper combination through part of a form-fill-seal machine;

Fig. 5 is a schematic illustration of a further  
10 alternative arrangement;

Fig. 6 is a schematic diagram of a modified embodiment of hole punch unit; and

Fig. 7 shows a zipper strip having been processed by the hole punch unit of Fig. 6.

15 Fig. 1 shows a zipper strip 10 having the customary male and female profiles which are interengageable to enable the fastener to be releasable and reclosable. The respective parts of the zipper strip to be attached to opposite sides of a bag, pouch or the like. The male/female profiled portion  
20 of the zipper strip is indicated generally at 12. In accordance with the invention holes 14 are punched or otherwise made through the zipper strip at predetermined spaced intervals along its length. The holes 14 are preferably circular or elliptical and must be of a dimension  
25 across the zipper sufficient to bridge the profiled portion 12. Other shapes of hole may alternatively be used as desired. It is important that the dimension of the holes lengthwise of the zipper is sufficient to ensure that the sealing jaws in the seal portion of the machine come within  
30 the profile of the holes.

Fig. 2 shows a reel 16 from which the zipper strip 10 is unwound. The zipper strip passes around a series of dancer

rollers 18a, 18b, 18c, before passing on to be united with the film of plastics material which will constitute the bags. Between the supply reel 16 and the first dancer roller 18a is positioned a punch unit, indicated generally at 20, which serves to provide the perforations 14 as shown in Fig. 1. This arrangement requires the movement of the zipper strip 10 to be intermittent as it is taken from the reel 16, so that the holes 14 can be punched through the material when the zipper strip is stationary.

Fig. 3 shows an alternative arrangement in which the punch unit 20 is positioned between two dancer units 18a, 18b, 18c and 22a, 22b, 22c. By a suitable construction and operation of the double dancer system it is possible for the zipper strip 10 to be brought to a stop, and to be punched, while zipper strip 10 is still being unreeled at a constant rate from the reel.

Fig. 4 illustrates how the punched-out holes 14 are made effective within the form-fill-seal machine. The incoming film 24 after having passed around a forming shoulder (not shown) and after having the punched zipper strip 10 sealed thereto passes downwardly as indicated. The bottom of the bag is indicated at 25. Below the end of the tube which is formed by the film 24 is a pair of heat sealing and severing jaws 26 which produce side seams in the tube to form the bags. The machine is operated so that the side seams which are produced by the jaws 26 are in alignment with the perforations 14 which, as indicated in Fig. 4, are spaced at bag-width intervals W. Thus, when the bags are separated at the side seals, the holes 14 will serve to seal each side of the bag against leakage.

Although in the embodiments described above, the holes in the zipper strip 10 are punched shortly after the zipper



strip leaves the supply reel 16, the punching operation may be better carried out at a point shortly before the zipper is heat sealed to the film, as shown in Fig. 5. This is to minimise problems of stretch and therefore synchronisation.

5 If the holes are produced early in the path from reel to web, then the hole spacing may have lost some regularity by the time the zipper is heat sealed to the web. Also, as mentioned above, the movement of the zipper can be intermittent to enable the punching to be carried out when the zipper is

10 stationary, or alternatively one can arrange for just a section of the zipper to be brought to a stationary position for the purpose of punching the holes while the rest of the zipper maintains its motion, by judicious choice of dancer rollers or equivalent means to take up the motion.

15 Fig. 5 shows the zipper supply reel 16 and a film supply reel 30. Shortly before the zipper 10 and film 32 enter a heat sealing unit 34 the zipper strip 10 is punched by punch unit 20. The film then carrying the zipper passes to a forming shoulder 36 and onwards.

20 Although punching of the holes 14 is preferred, other methods of perforating the zipper can alternately be used.

The zipper strip 10 shown in Fig. 7 is again provided with the customary male and female profiles, indicated generally at 12. An elongate hole 14 is punched or otherwise

25 made through the zipper strip at predetermined spaced intervals along its length. The hole 14 is here shown as generally elliptical and must be of a dimension across the zipper sufficient to bridge the profiled portion 12. Other shapes of hole 14 may be used as desired. In this embodiment,

30 on each side of the hole 14 there is a fusion point 38 where the male and female parts of the profile are fused together.

Fig. 6 shows, in schematic form, a unit 40 which can be

used to achieve this result. The unit 40 comprises a central punch 20 of a shape to match the dimensions of the hole 14. The unit 40 also includes two heated pins 42 which are arranged to pass through holes in a die 44 and then pierce 5 through the zipper at the fusion points 38. The heat from the pins 42 causes the fusion. The unit 40 is arranged to move in a reciprocating manner relative to the zipper strip, with the motion of the unit 40 and strip 10 being synchronised to produce the spaced holes 14.

10       The primary advantages of this embodiment of zipper strip in accordance with the invention are that the fusing of the profiles together means that one stops the holes from slipping apart, and also that the profiles are kept together so that when one starts to close the bag or pouch the male and female 15 profiles are already together.

The hole punch in accordance with the invention can be fitted to both vertical and horizontal form-fill-seal machines, as well as to conversion machines.

## CLAIMS:

1. A zipper strip having male and female profile portions and provided at intervals along its length with holes therethrough of a size and location to bridge the male/female profile portions.  
5
2. A zipper strip according to claim 1, in which the holes are circular.
- 10 3. A zipper strip according to claim 1, in which the holes are elliptical.
4. A zipper strip according to claim 1, 2 or 3, in which the holes are punched holes.  
15
5. A zipper strip according to any preceding claim, in which the male and female profile portions are fused together adjacent to each side of each hole.
- 20 6. A method of making zipper strip which comprises the steps of:
  - a) delivering zipper strip having interengaged male and female profile portions to a perforating device; and
  - 25 b) making holes therethrough at intervals along the length of the strip of a size and location to bridge the male and female profile portions.
7. A method as claimed in claim 6, which includes fusing the male and female profile portions together adjacent to each side of each hole.  
30

8. A method of manufacturing a reclosable plastics bag which comprises the steps of:
- i) delivering a film or web of plastics material from a supply means to bag-forming means;
  - 5 ii) delivering zipper strip having male and female profile portions from a supply means to the film or web and sealing the zipper strip thereto; and
  - iii) before the aforesaid sealing, making holes through the zipper strip at intervals along its length of
  - 10 a size and location to bridge the male and female profile portions.
9. A method as claimed in claim 8, which includes fusing the male and female profile portions together adjacent to
- 15 each side of each hole.
10. A method as claimed in claim 8 or 9, in which the making of said holes through the zipper strip is effected in the path of the zipper strip shortly before the sealing of
- 20 the strip to the film or web.
11. Apparatus for making reclosable plastics bags which comprises:
- i) supply means for a film or web of plastics
  - 25 material;
  - ii) supply means for zipper strip having interengageable male and female profile portions;
  - iii) sealing means arranged to seal the zipper strip to the film or web;
  - 30 iv) bag-forming means following the sealing means; and
  - v) perforating means on the path of the zipper strip between its supply means and the sealing means, the

perforating means being arranged to make holes through the zipper strip at intervals along its length of a size and location to bridge the male and female profile portions.

5

12. Apparatus according to claim 11, in which the perforating means comprises a punch and die.

10 13. Apparatus according to claim 11 or 12, in which the perforating means also includes means to fuse the male and female profile portions together adjacent to each side of each hole.

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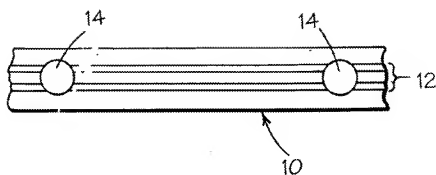


FIG. 1.

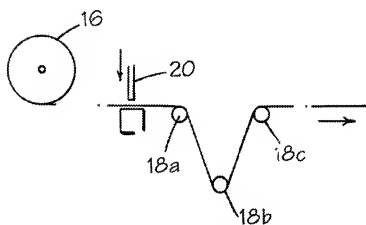


FIG. 2.

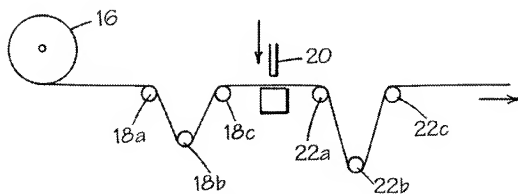


FIG. 3.

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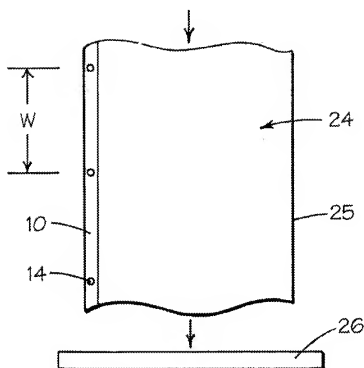


FIG. 4.

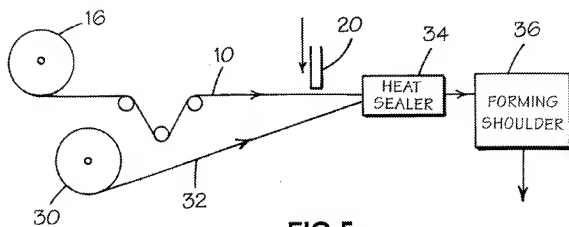


FIG. 5.

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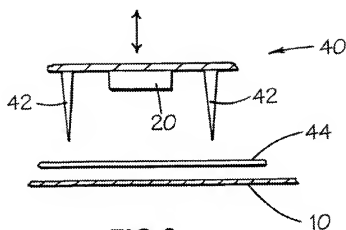


FIG. 6.

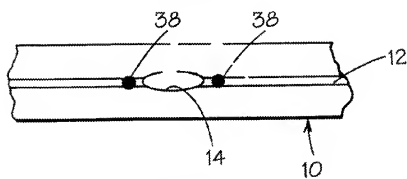


FIG. 7.



## INTERNATIONAL SEARCH REPORT

Int. Serial Application No.

PCT/GB 99/02661

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A44B19/16 B65D033/25 B31B19/90

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B29C B65D B31B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 481 783 A (REYNOLDS CONSUMER PROD) 22 April 1992 (1992-04-22) column 8, line 15 -column 9, line 29; figures 2-5	1-13
A	US 5 273 511 A (BOECKMAN HUGO) 28 December 1993 (1993-12-28) abstract; figures	1-13

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Information on patent family members

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